The effect of cold acclimation on brown adipose tissue.

Gepubliceerd: 28-02-2012 Laatst bijgewerkt: 13-12-2022

Chronic cold exposure will increase: 1. Basal metabolism and facultative thermogenesis; 2. Brown adipose tissue activity and volume; 3. Skeletal muscle mitochondrial uncoupling and result in BRITE cell recruitment.

Ethische beoordeling	Positief advies
Status	Werving gestopt
Type aandoening	-
Onderzoekstype	Interventie onderzoek

Samenvatting

ID

NL-OMON20696

Bron
NTR

Aandoening

Brown adipose tissue
Cold acclimation
Skeletal muscle
Non-shivering thermogenesis

Ondersteuning

Primaire sponsor: Maastricht University Medical Centre + (MUMC+)
Overige ondersteuning: This study is financed by the NWO-TOP grant (Netherlands Science Foundation ZonMw, TOP 92109037) provided to W.D. van Marken Lichtenbelt

Onderzoeksproduct en/of interventie

Uitkomstmaten

Primaire uitkomstmaten

1. Standard uptake values (SUVs) of FDG of active brown adipose tissue with the PET/CT-

scans, one time prior and one time post the cold acclimation period (2x 2hour);
2. Energy expenditure with indirect calorimetry, one time prior, half way and one time post the cold acclimation period (3x 3hour);
3. Skeletal muscle mitochondrial uncoupling with the muscle biopsy, one time before and one time post the cold acclimation period (2x 30minutes).
BRITE cell recruitment with the fat biopsy, one time prior and one time post the cold acclimation period (2x 30minutes).

Toelichting onderzoek

Achtergrond van het onderzoek

The volunteers will undergo two PET/CT-scans, in which cold-induced BAT activity will be measured before and after a cold acclimation period of 10 days. To investigate the role of the skeletal muscle mitochondrial uncoupling and BRITE cell recruitment a muscle and fat biopsy sample will be taken prior to the acclimation period and afterwards. Finally, body composition will be determined with a DXA-scan, and skin perfusion and relevant body temperatures will be measured as well.

Doel van het onderzoek

Chronic cold exposure will increase:

1. Basal metabolism and facultative thermogenesis;

2. Brown adipose tissue activity and volume;

3. Skeletal muscle mitochondrial uncoupling and result in BRITE cell recruitment.

Onderzoeksopzet

Participation will take approximately 70 hours.

Onderzoeksproduct en/of interventie

The volunteers will undergo two PET/CT-scans, in which cold-induced BAT activity will be measured before and after a cold acclimation period of 10 days. To investigate the role of the skeletal muscle mitochondrial uncoupling and BRITE cell recruitment a muscle and fat biopsy sample will be taken prior to the acclimation period and afterwards. Finally, body composition will be determined with a DXA-scan, and skin perfusion and relevant body temperatures will be measured as well.

Cold acclimation is achieved by exposure to an environmental temperature of 16 degrees (cold room) for 10 consecutive days. The first day the subjects will remain in this cold room

for 2 hours, the second day for 4 hours and days 3-10 for 6 consecutive hours. The subjects are dressed in t-shirt, shorts and flip flops. For these 6 hours, the subjects are instructed to refrain from physical activity as much as possible. Watching TV and working on a computer are activities that can be done.

Contactpersonen

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Deelname eisen

Belangrijkste voorwaarden om deel te mogen nemen (Inclusiecriteria)

1. BMI 18-25;

2. Age 18-30;

3. Females: On oral contraceptive;

4. Caucasians.

Belangrijkste redenen om niet deel te kunnen nemen (Exclusiecriteria)

1. Diabetes Mellitus;

2. Females: Pregnancy;

3. Participate in physical activity more than 2x/week;

4. Use of Beta-blockers;

5. Cardiovascular diseases;

6. Asthma or other obstructive pulmonary diseases;

7. Elevated fasting blood glucose level (> 5.6 mmol/L);

8. Participation in earlier research that included a PET/CT-scan;

9. Radiation therapy due to medical treatment.

Onderzoeksopzet

Opzet

Type:	Interventie onderzoek
Onderzoeksmodel:	Parallel
Toewijzing:	N.v.t. / één studie arm

Controle: N.v.t. / onbekend

Deelname

Nederland

Status:	Werving gestopt
(Verwachte) startdatum:	01-12-2011
Aantal proefpersonen:	20
Type:	Werkelijke startdatum

Ethische beoordeling

Positief advies

Datum:	28-02-2012

Soort: Eerste indiening

Registraties

Opgevolgd door onderstaande (mogelijk meer actuele) registratie

Geen registraties gevonden.

Andere (mogelijk minder actuele) registraties in dit register

Geen registraties gevonden.

In overige registers

Register	ID
NTR-new	NL3190
NTR-old	NTR3341
Ander register	METC / CCMO : 11-3-052 / NL37639.068.11;
ISRCTN	ISRCTN wordt niet meer aangevraagd.

Resultaten

Samenvatting resultaten
N/A